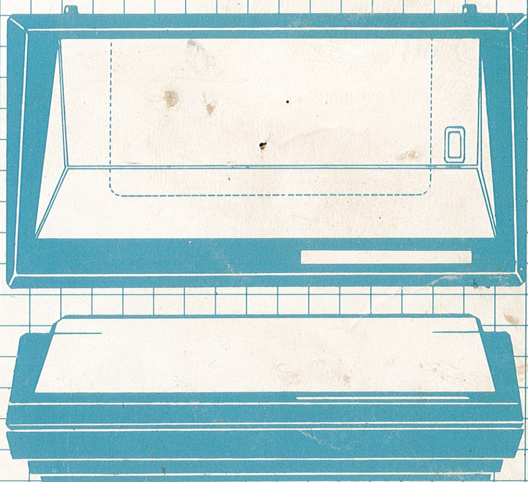
OWNER'S MANUAL

GP-100

Graphic Printer

DICK SMITH X-3250



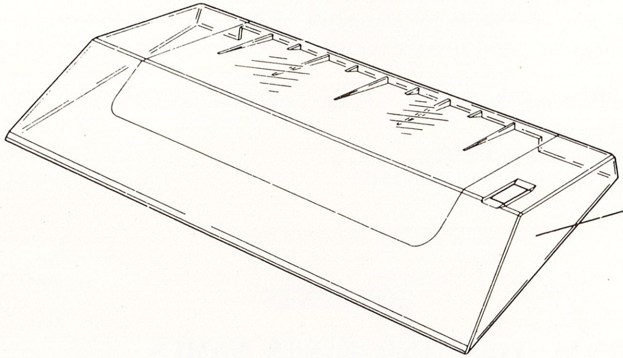
DICK SMITH
DESIGNED FOR AUSTRALIA

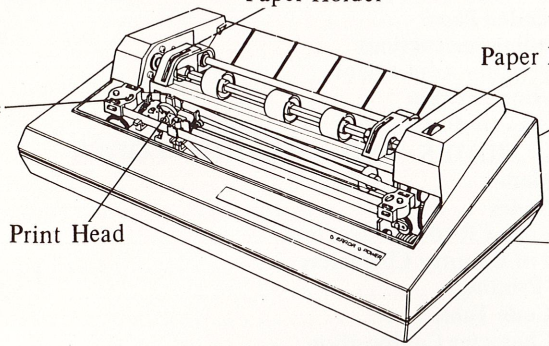
Main Features

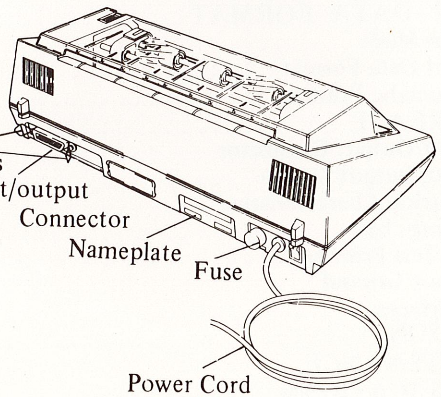
- Double width character output under software control.
- Graphics capability (picture and graph output capabilities).
- In the graphic mode, a graphic data pattern can be repeated as many times as you want with a single command.
- Print position addressable by character or dot column (positioning control).
- Graphic, character, and double width character modes can be intermixed on a single line.
- Automatic Printing. When the text exceeds the maximum line length no data is lost due to overflow.
- Self-test printing is available.
- Parallel interface is Centronics type.

CONTENTS

[1] EXTERNAL VIEW AND PARTS NAMES



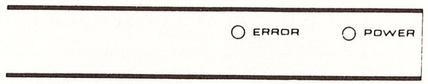




[2] FUNCTIONS AND CONTROLS

1. **Power Switch**
   It is located at the lower back side of the Printer.

2. **Indicators**



POWER
The lamp is ON when power is turned on and OFF when it is off.

ERROR
The lamp is ON when machine error occurs. It is required to turn power off or to input an $\overline{\text{INITIAL}}$ signal in order to reset the error.

3. **Printer Cover**
   This is for shielding dust and sound.
   Place it on top of the Printer properly.

4. **Paper Feed Dial**
   Paper can be advanced manually by rotating this dial, and its advance pitch is 1/18 inch. Note that advancing paper in reverse direction is impossible.

5. **Fuse**
   The fuse of the primary is located at the back of the Printer.

[3] SETTING UP

1. Recommended Paper

Use the following types of paper with the GP-100

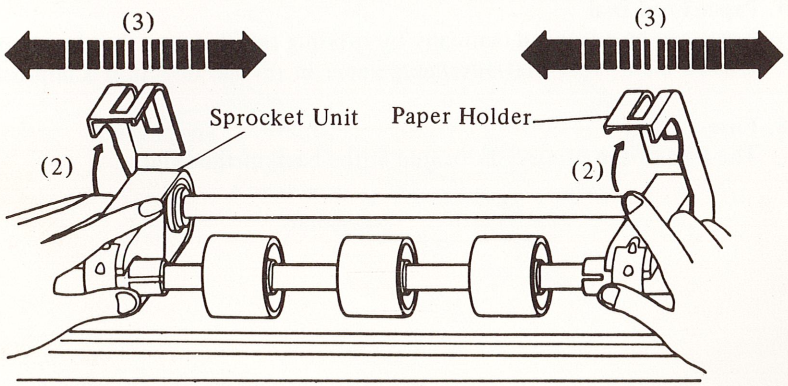
PAPER WIDTH	4.5–10 inches (4–9.5 inches between sprocket holes)
PAPER THICKNESS	0.075 mm (3 mils) is recommended
PAPER WEIGHT	• 45–55 kg equivalent in Japan • 15 pounds (15#) in USA
MULTIPLE PART PAPER 2 INCLUDING ORIGINAL	• 35–40 kg equivalent • Total thickness 0.12 mm or less is recommended

Note; The paper weight in Japan stipulated in JIS is based on the measurement of 788 mm x 1091 mm x 1000 sheets.

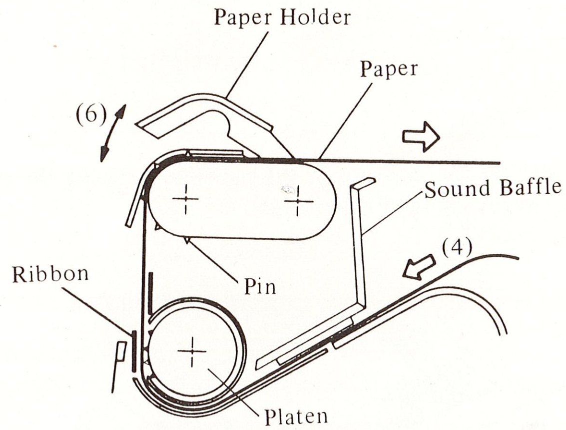
2. Paper Loading Instructions

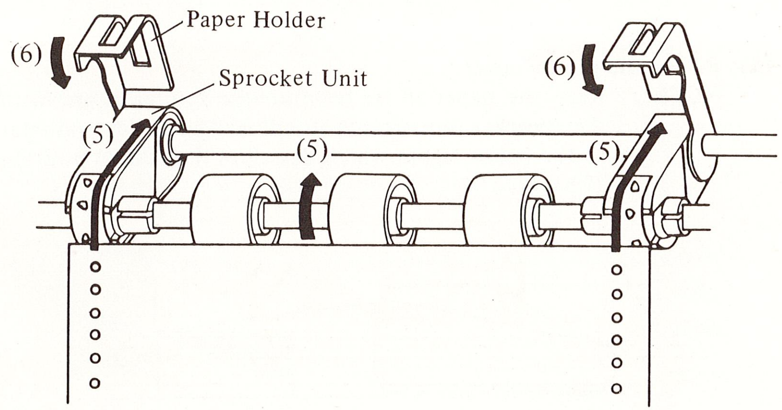
Turn off the power switch before loading the paper

(1) Remove the printer cover.
(2) Lift up the paper holders on both sides.
(3) Adjust the sprocket unit spacing to accommodate the paper so that the paper will be neither stretched too tightly nor loose and wrinkled.

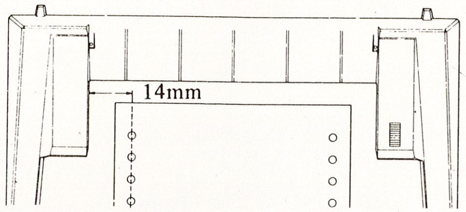


(4) Insert the paper from the rear of the Printer.
(5) When the paper appears from between the ribbon and the platen, fit it over the sprocket pins.
(6) Lower the paper holders.

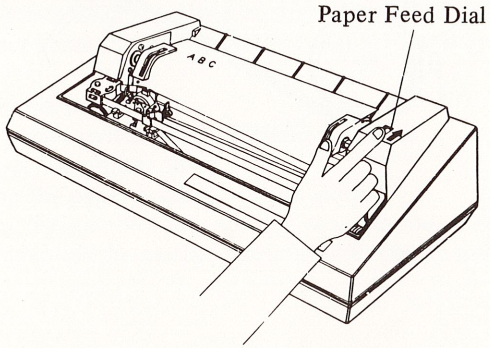




When loading the paper into the Printer, you should set the paper at the position shown below, leaving approximately 14 mm between the left-edge of the Printer and the center of the left sprocket holes.

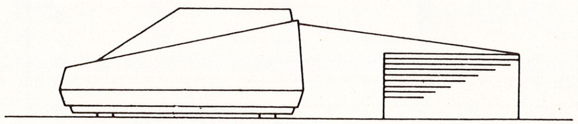


(7) Manually set the position of the paper by rotating the paper feed dial forward. See the Figure below.



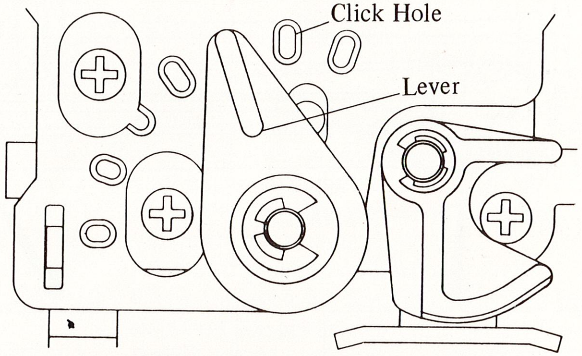
(8) Put on the printer cover.

NOTE: Keep the paper to be fed into the Printer in line with the sprocket pins so that it will feed smoothly and refer to the below figure which describes the desired position of paper.



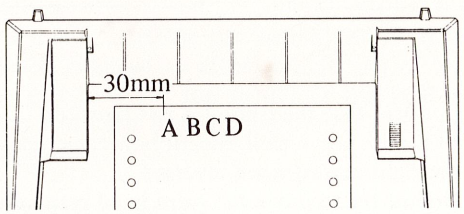
3. **Printing Pressure Adjustment**

You may adjust a lever on the print head according to the thickness of the paper. If smudging occurs or if printing is too dark, move this lever one click hole counterclockwise at a time until you are satisfied with the printing quality; if printing is too light, move it clockwise. When adjusting the lever, make sure that it is placed directly in the hole, not "in between" two of them.



4. **Print Starting Position**

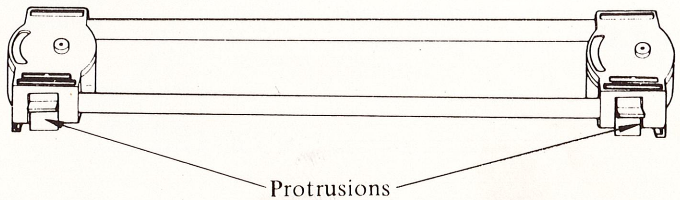
As described below, printing starts at the position about 30 mm away from the left-edge of the Printer.



5. **Ribbon Cassette Installation**

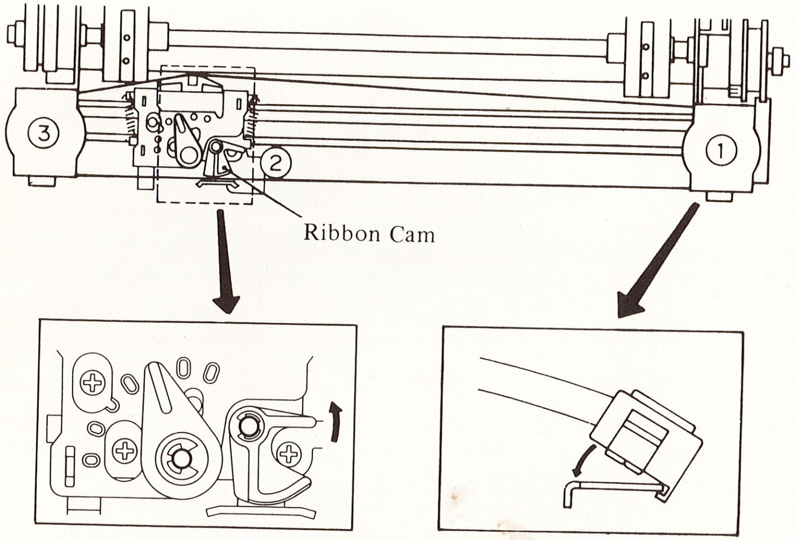
(1) Locate the ribbon cassettes which are packed in the carton separately from the Printer.

(2) Place the ribbon cassettes so the protrusions are facing the front side of the Printer.



(3) Remove the printer cover.

(4) Place the ribbon cassettes in the positions ①, ②, and ③ as shown in the figure below.



NOTES:
1. Confirm that the ribbon is not twisted.
2. You can not install the ribbon cassettes if the left and the right cassettes are reversed.
3. **Do not try to move the print head manually. Forcing it to move may damage the Printer.**
4. Raise the inner side of the ribbon cassette a little for easier removal and/or installation.

When replacing a worn-out ribbon, use only the specified replacement ribbon. Remove the old ribbon following the above procedure in reverse and replace it with the new ribbon.

[4] PRINTING MODES AND CONTROL CODES

1. Printing Modes

(1) Character mode
(2) Double width character mode
(3) Graphic mode

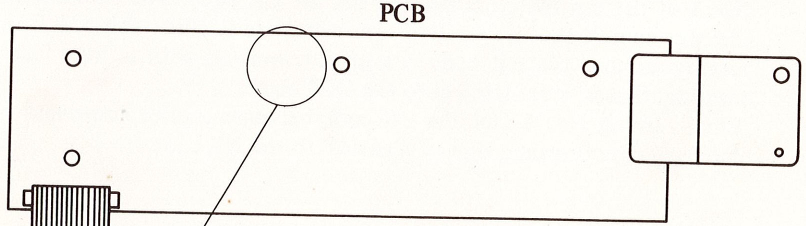
2. Control Codes

(1) NL (0, A)	Line feed after printing
(2) CR (0, D)	Line feed or no line feed after printing (switch selectable, see [4]-3)
(3) DC4 (1, 4)	No line feed after printing
	(The NL, CR, and DC4 are print commands)
(4) BS (0, 8)	Graphic mode command
(5) SO (0, E)	Double width character mode command
(6) SI (0, F)	Character mode command
(7) POS (1, 0)	Print start position addressing
(8) ESC (1, B)	When followed by the POS code it is used to specify a start position according to the dot address.
(9) FS (1, C)	Repeat graphic select command

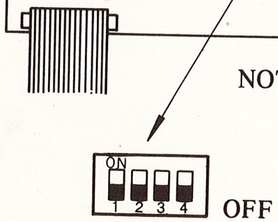
3. Control Code CR (0, D) Selection

The Printer has a Printed Circuit Board (PCB) on which a dip switch is located.
With turning No. 3 of the dip switch ON or OFF, the meaning of CR (0, D) can be changed to either NL (0, A) or DC4 (1, 4) respectively.
The dip switch is at the top center of the PCB as shown below and it can be seen from the back of the printer after removing the five screws and the upper case.

PCB



NOTE: Four switches are set to the "OFF" side when shipped from the factory.



4. Selection of USA, U.K., GER. or SWED. Characters

Either of four country characters can be selected by setting No. 1 and No. 2 of the dip switch according to the following table. As they are set to OFF when shipped from the factory, the characters for USA are selected.

Country character codes

Country \ Code	1	2	3	4	5	6	7	8	9	10	11	12	DIP SWITCH	
	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E	No. 1	No. 2
USA	#	$	@	[	\	]	^	`	{	¦	}	~	OFF	OFF
U.K.	£	$	@	[	\	]	^	`	{	¦	}	~	OFF	ON
GERMANY	#	$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß	ON	OFF
SWEDEN	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü	ON	ON

5. Self-Test Printing

There are two ways to conduct the self-test printing; one is to turn ON No. 4 of the dip switch and the other is to short the $\overline{\text{TEST}}$ signal of the input/output connector by connecting, for instance, pin No. 35 ($\overline{\text{TEST}}$) to pin No. 15 (GND). The print sample is as follows.

```
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEF·····
pqrstuvwxyz{¦}~  !"#$%&'()*+,-./0123456·····
```

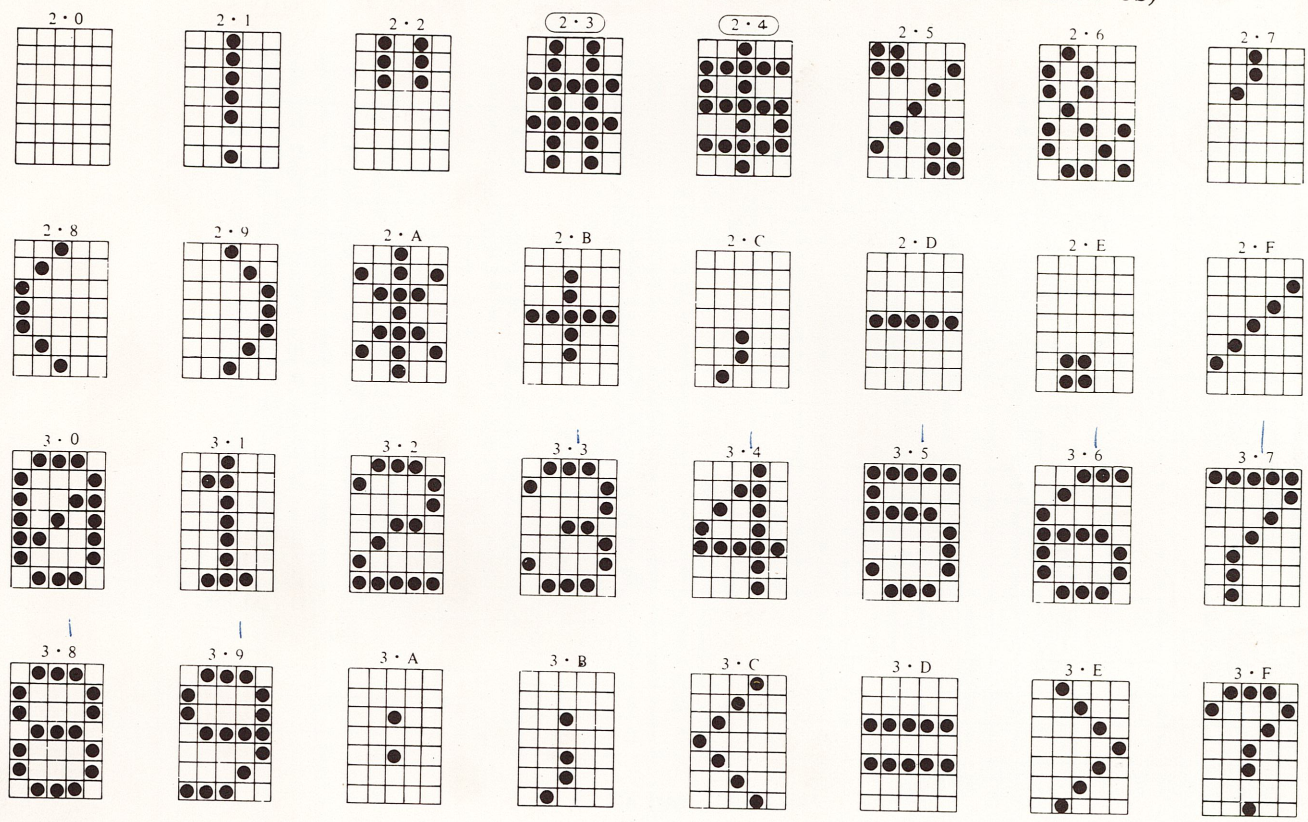
No. 3 of the dip switch is allotted for the CR code. The four switches of the dip switch are set to OFF (numeral side) when shipped from the factory so that the CR code is a print command with no line feed after printing, that is, it is identical to the DC4 code.
When turning No. 3 ON, the CR code becomes a print command with a line feed after printing, that is, identical to the NL code.

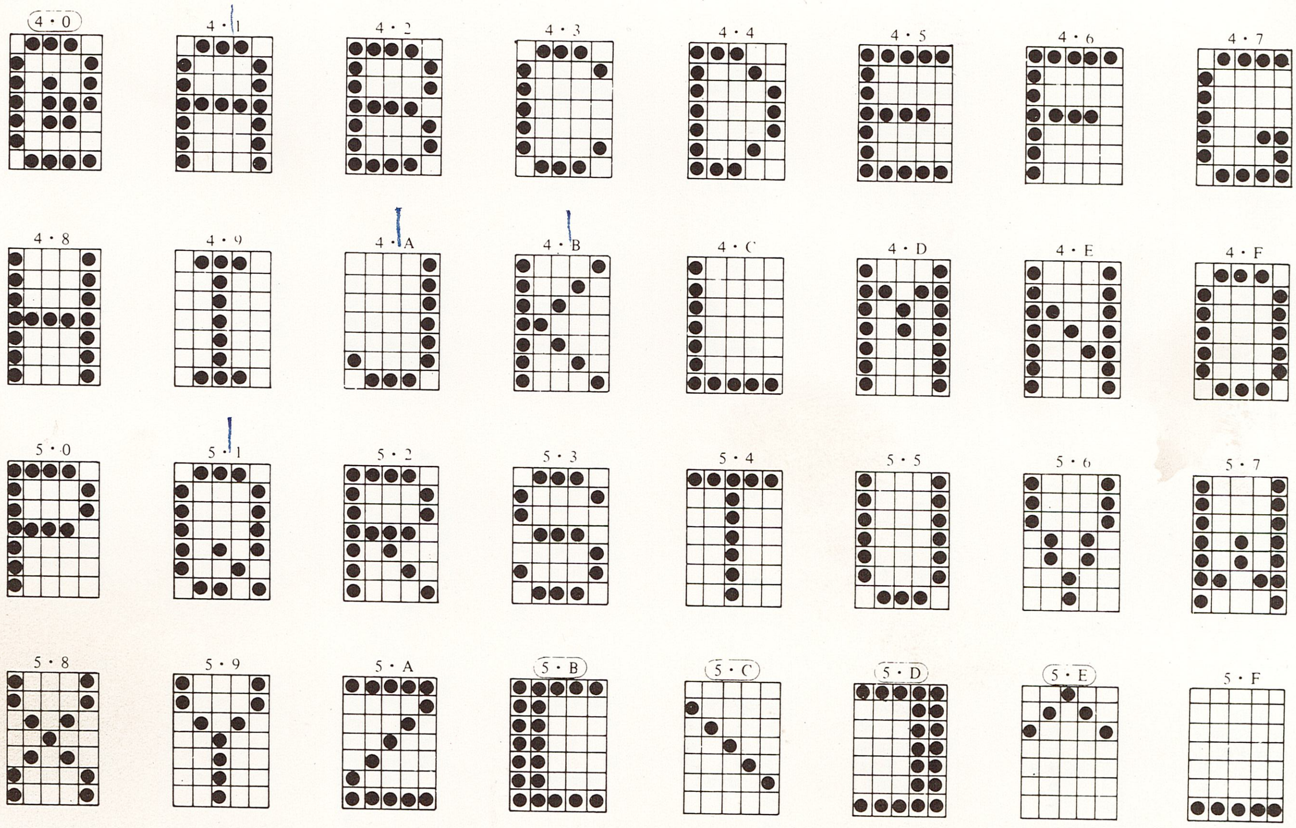
6. GP-100 Code Table

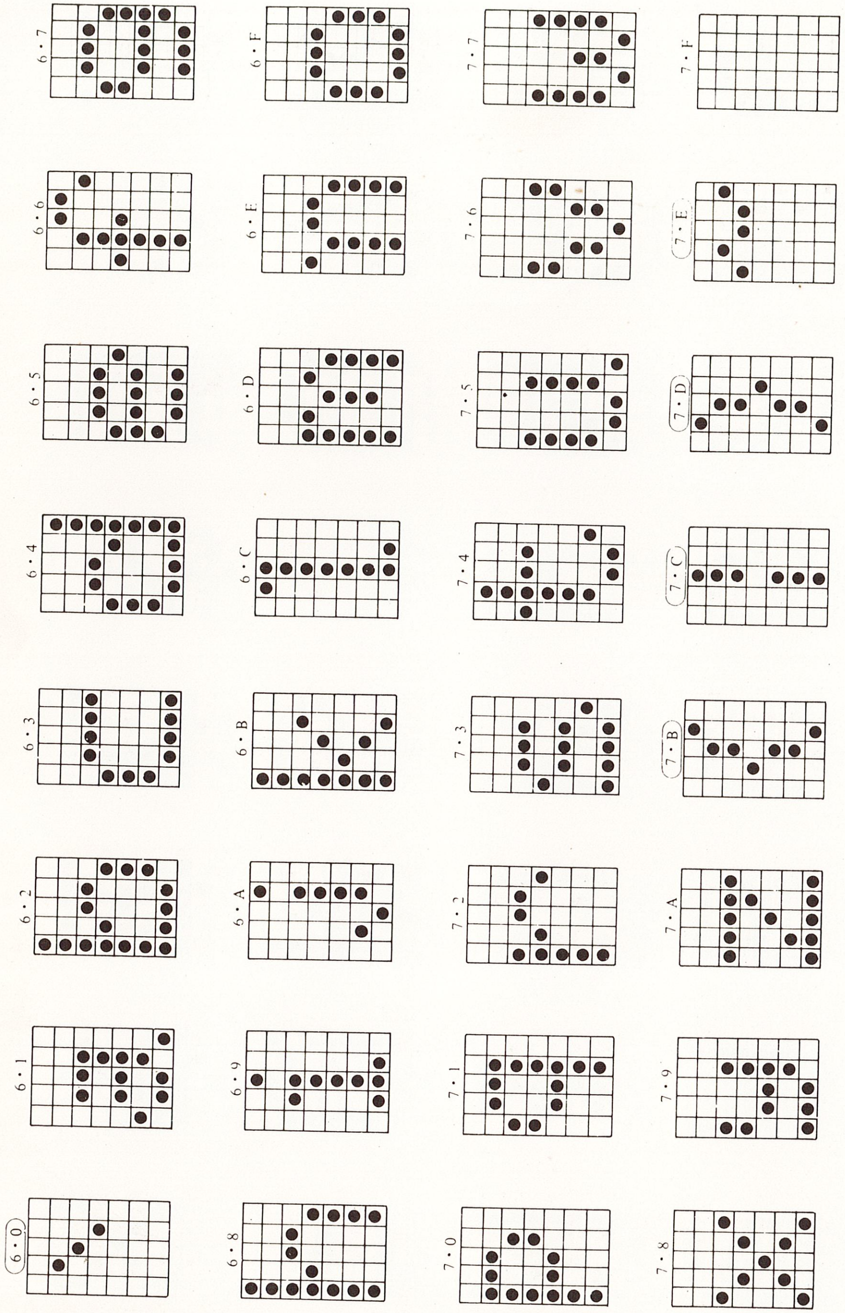
D4	D3	D2	D1	D8 D7 D6 D5 →	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
					0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	0	0	0	0		POS	SP	0	○	P	○	p			à	Â	P	p		
0	0	0	1	1			!	1	A	Q	a	q			ä	Ä	Q	q		
0	0	1	0	2			"	2	B	R	b	r			à	Ö	R	r		
0	0	1	1	3			○	3	C	S	c	s			â	Ô	S	s		
0	1	0	0	4		DC4	○	4	D	T	d	t			É	Ü	T	t		
0	1	0	1	5			%	5	E	U	e	u			È	ü	U	u		
0	1	1	0	6			&	6	F	V	f	v			é	ù	V	v		
0	1	1	1	7			'	7	G	W	g	w			è	û	W	w		
1	0	0	0	8	BS		(	8	H	X	h	x			ê	¥	X	x		
1	0	0	1	9			)	9	I	Y	i	y			#	£	Y	y		
1	0	1	0	A	NL		*	:	J	Z	j	z			@	¢	Z	z		
1	0	1	1	B		ESC	+	;	K	○	k	○			β	§	[	¦		
1	1	0	0	C		FS	,	<	L	○	l	○			`	↑	\	¦		
1	1	0	1	D	CR		-	=	M	○	m	○			¤	↓	]	¦		
1	1	1	0	E	SO		.	>	N	○	n	○			μ	←	^	~		
1	1	1	1	F	SI		/	?	O	_	o	SP			$	→	_	SP		

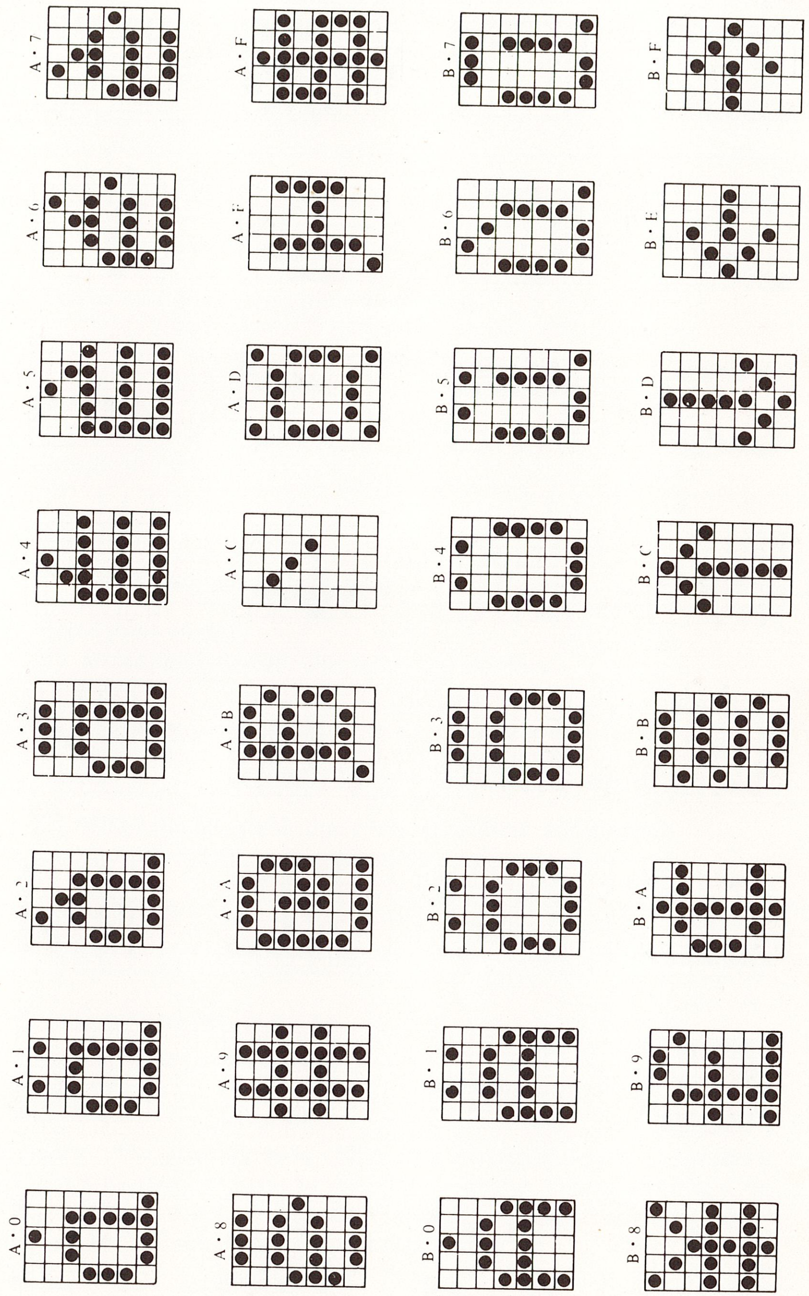
Note: Circles ○ are set according to the dip switch.

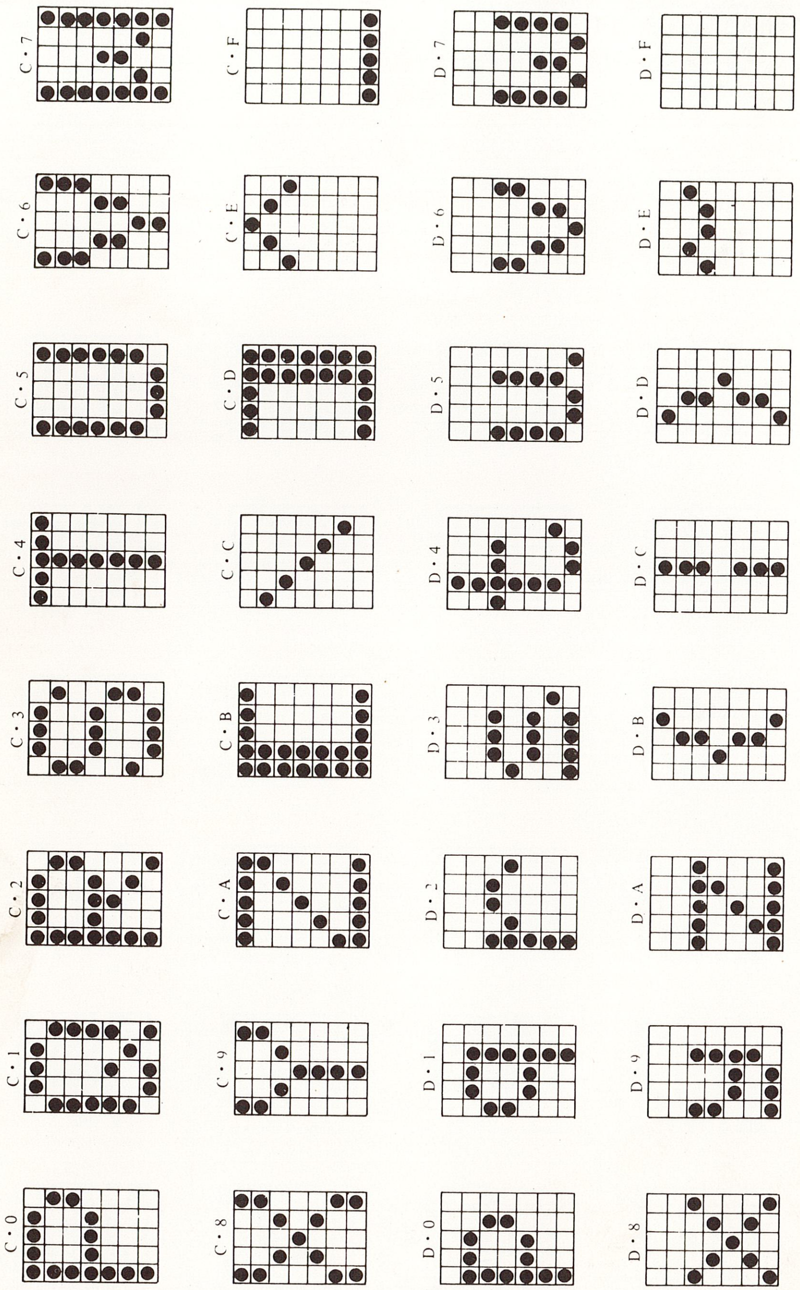
7. GP-100 Character Composition (The encircled ones are for US)






6・7
6・6
6・5
6・4
6・3
6・2
6・1
6・0
6・F
6・E
6・D
6・C
6・B
6・A
6・9
6・8
7・7
7・6
7・5
7・4
7・3
7・2
7・1
7・0
7・F
7・E
7・D
7・C
7・B
7・A
7・9
7・8


A・7
A・6
A・5
A・4
A・3
A・2
A・1
A・0
A・F
A・E
A・D
A・C
A・B
A・A
A・9
A・8
B・7
B・6
B・5
B・4
B・3
B・2
B・1
B・0
B・F
B・E
B・D
B・C
B・B
B・A
B・9
B・8



[5] INPUT DATA FORMAT

1. Input Mode

A. Character print mode (SI)

SI (0F)	DATA	POS (10)	A (30~37)	B (30~39)	DATA	POS (10)	D	E	DATA	PC

B. Double width character print mode (SO)

SO (0E)	DATA	POS (10)	A	B	DATA	PC

C. Graphic print mode (BS)

BS (08)	GRAPHIC DATA	ESC (1B)	POS (10)	HP (00, 01)	LP (00~FF)	GRAPHIC DATA	POS (10)	A	B	FS (1C)	NR (00 ~ FF)	GD	PC

D. Mixed print mode

(1) Mixed double width characters and graphics

SO (0E)	DATA ..	POS (10)	A	B	DATA ..	BS (08)	ESC (1B)	POS (10)	HP 1	LP 1	GRAPHIC DATA ...	ESC (1B)	POS (10)	HP 2	LP 2	FS (1C)	NR	GD	PC

(2) Mixed double width characters, characters, and graphics

SO (0E)	DATA ..	POS (10)	A	B	DATA ..	SI (0F)	POS (10)	C	D	DATA ..	BS (08)	ESC (1B)	POS (10)	HP	LP	GRAPHIC DATA ...	PC

PC : Print Command (NL, DC4, CR)
NR : Number of Repetition
GD : Graphic Data

Reference: The print mode in effect after executing a print command is that which existed just prior to the print command. This means that if the print mode for the next line does not need to be changed, the mode select command for the next line may be omitted.

2. Input Data Format

(1) The character and control codes conform to the ASCII 8-bit code.

(2) a. The 2 bytes that follow the POS code are the ASCII code numbers to indicate the absolute address away from the home position (character units)

b. The 2 bytes that follow the ESC POS codes are binary data used to indicate the absolute address away from the home position (dot units)

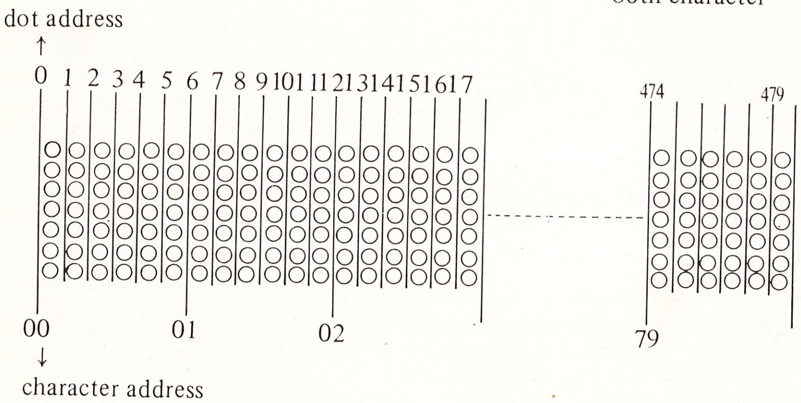
	D_8	D_7	D_6	D_5	D_4	D_3	D_2	D_1	
1st byte	0	0	0	0	0	0	0	P_9	Higher 1 bit (HP)
2nd byte	P_8	P_7	P_6	P_5	P_4	P_3	P_2	P_1	Lower 8 bits (LP)

The above 2 bytes are used to indicate the starting print position and are treated as a single 9 bit binary notation data inside the Printer.

P_9	P_8	P_7	P_6	P_5	P_4	P_3	P_2	P_1

c. Examples of the position addresses corresponding to a. and b. are given below.

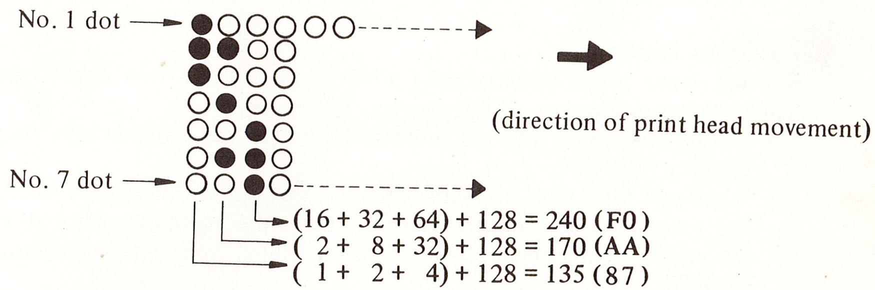
Character address	Dot address	
01	6 (Decimal)	2nd character
02	12	3rd character
79	474	80th character



(3) Graphic data format

128	64	32	16	8	4	2	1
1	PD_7	PD_6	PD_5	PD_4	PD_3	PD_2	PD_1

PD_7 → No. 7 dot (bottom dot) PD_1 → No. 1 dot (top dot)



(4) The byte following the FS code shows how many times the graphic data is to be repeated..

First byte	0	0	0	1	1	1	0	0	... FS (1, C) code
	R_8	R_7	R_6	R_5	R_4	R_3	R_2	R_1	... Number of repetition (binary)
	1	PD_7	PD_6	PD_5	PD_4	PD_3	PD_2	PD_1	... Graphic data to be repeated

Setting the number of repetition to "0" results in 256 repetitions.

(5) Data buffer size.

The Printer's full-line dot buffer can hold up to 480 bytes for all the dots to be printed in a line. One byte contains seven bits of data corresponding to one dot column of seven dots to be printed.

(6) Line feed spacing

Linefeeds are executed in accordance with the print mode in effect just prior to the execution of a print command.

- Character and double width character modes . . . . 6 LPI
- Graphic mode . . . . 9 LPI

3. Automatic Printing

Printing takes place automatically when either of the two conditions listed below occurs.

(1) During data input, the data buffer becomes full and the next inputting data is a print data.

(2) When one print data of character can not be printed within the 480th dot column in a character printing mode, the input data prior to it are printed automatically and it will be printed from the first column of the next line.

In case either of the above two conditions occurs, the last input data will remain in the buffer.

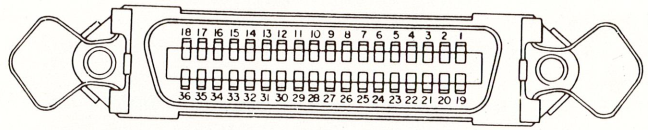
Others:

* The mode in effect during automatic printing remains the same as the latest selected one until a mode select change is specified.
* After a print command is input or automatic printing starts, only one line of paper is fed in case there is no print data or there are only space data in a line. Of course when a line feed specification is not included in a print command, there is no actual movement.

[6] INTERFACE

1. Input/Output Connector

Use a connector, AMP CHAMP 36 BAIL LOCK TYPE, to input data into the Printer. Pin configuration and its signals of the receptacle in left rear of the Printer are described below.



PIN	SIGNAL	PIN	SIGNAL	
1	$\overline{\text{STROBE}}$	19	TWISTED PAIR GND	(PAIR WITH 1 PIN)
2	DATA 1	20	TWISTED PAIR GND	(PAIR WITH 2 PIN)
3	DATA 2	21	TWISTED PAIR GND	(PAIR WITH 3 PIN)
4	DATA 3	22	TWISTED PAIR GND	(PAIR WITH 4 PIN)
5	DATA 4	23	TWISTED PAIR GND	(PAIR WITH 5 PIN)
6	DATA 5	24	TWISTED PAIR GND	(PAIR WITH 6 PIN)
7	DATA 6	25	TWISTED PAIR GND	(PAIR WITH 7 PIN)
8	DATA 7	26	TWISTED PAIR GND	(PAIR WITH 8 PIN)
9	DATA 8	27	TWISTED PAIR GND	(PAIR WITH 9 PIN)
10	$\overline{\text{ACK}}$	28	TWISTED PAIR GND	(PAIR WITH10PIN)
11	BUSY	29	TWISTED PAIR GND	(PAIR WITH11PIN)
12	GND	30	GND	
13	NC	31	$\overline{\text{INITIAL}}$	(PAIR WITH14PIN)
14	GND	32	$\overline{\text{ERROR}}$	(PAIR WITH15PIN)
15	GND	33	GND	
16	GND	34	$\overline{\text{CLK}}$	(PAIR WITH33PIN)
17	CHASSIS GND	35	$\overline{\text{TEST}}$	(PAIR WITH16PIN)
18	+5V 80mA Max.	36	+5V	

NOTES: 1. The combined output of pins 18 and 36 is 80 mA maximum.
2. NC stands for no connection.

2. Input/output Signals

(1) Input signals to the Printer

* DATA 1
  DATA 2
  DATA 3
  DATA 4
  DATA 5
  DATA 6
  DATA 7
  DATA 8 — 8-bit data signals. Signal "HIGH" represents Logic '1'.

* STROBE — The strobe signal is used to read in 8 bits of data. Data is read in when the signal goes 'LOW'.

* INITIAL — This signal is used to set the Printer to an initial state and is normally "HIGH". Bringing the line "LOW" and returning it "HIGH" starts the clearing action which sets the Printer to an initial state.

* TEST — This signal is used for the self-printing test which is executed by bringing the line "LOW".

(2) Output signals from the Printer

* BUSY — This signal indicates the BUSY status of the Printer. When "HIGH" the Printer can not accept data.

* ACK — This signal is used to indicate that the Printer is awaiting data.

NOTE: The BUSY and ACK signals are always output when the Printer accepts data input.

* ERROR — A printer error condition causes this signal to go "LOW". When this happens all the control circuits internal to the Printer halt. There are two ways to correct this situation.
  - Turn the Printer off – and then back on two seconds later.
  - Input the INITIAL signal

  An ERROR occurs if the dot timing goes bad.

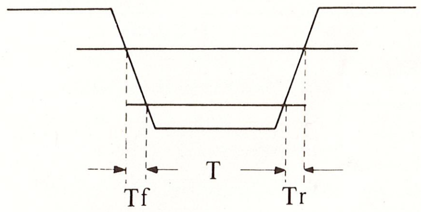
* CLK — This is a 400 KHz clock signal. It can be used with an interface if needed.

3. Electrical Characteristics

(1) Signal levels

All input/output signals are TTL level.

"HIGH" level ..... +2.4 ~ 5.0V } at the Printer input terminals
"LOW" level ..... +0.0 ~ 0.4V }

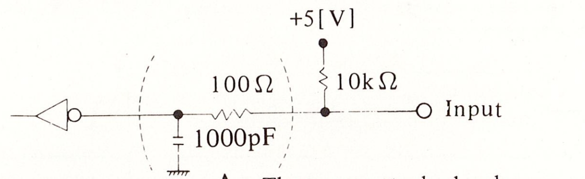


Tf and Tr ≒ 100 ns or less
T ≒ value shown on the timing chart

(2) Input/output conditions

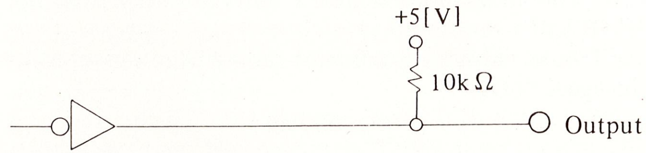
Input/output signals are pulled up with 10 k ohms.

* Input signals
  The input load corresponds to one 74LS04
* Output signals
  The output corresponds to a 74LS04. The recommended output load corresponds to one LSTTL load.



74LS04 equivalent

These are attached only to the INITIAL and STROBE signals.



74LS04 equivalent

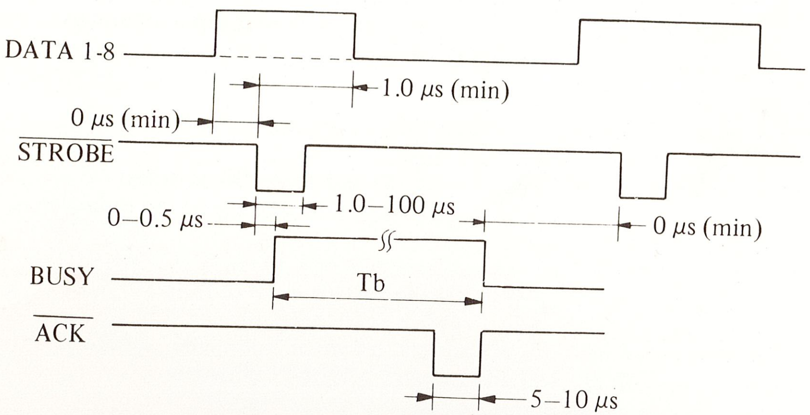
(3) Signal cable length

Maximum length is two meters with the following signals forming twisted pairs with the GND.

STROBE, INITIAL, BUSY, ACK, ERROR, CLK

4. **Timing Chart**

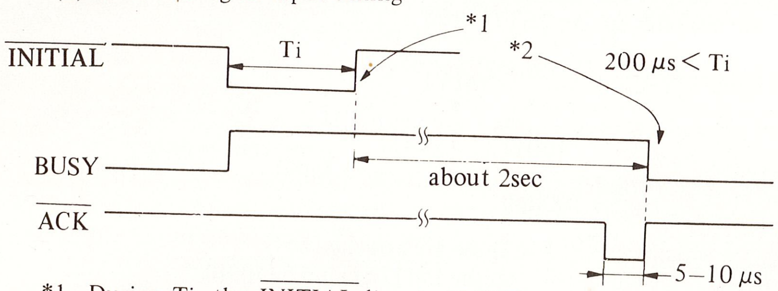
(1) Data input



Tb; CHARACTER CODE — 100 μs or more
CR/NL/DC4 CODE — PRINT + CARRIAGE RETURN (about 3 seconds max.)

Reference: CR = (0, D), NL = (0, A), DC4 = (1, 4)

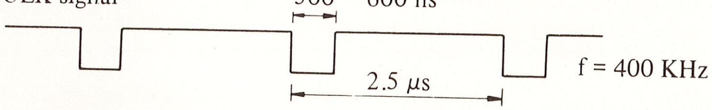
(2) INITIAL signal input timing



*1 During Ti, the INITIAL line is "LOW" and the Printer is held in a reset state. The initialization sequence starts execution after the line goes "HIGH".

*2 After the Printer finishes execution of the initialization sequence the BUSY line goes "LOW".

(3) CLK signal



5. **Self-Test Printing**

Bringing the TEST line "LOW" starts the self-test printing which continues until it is returned "HIGH".

6. **Chassis Ground**

As stated in [6]-3-(3), all of the signal lines should be twisted pairs with the signal ground lines, but it is further recommended that the cable be shielded and that one terminal be connected to the CONTROLLER CHASSIS GND and the other connected to the FRAME GND on the controller side.

7. **Interfaces**

- RS-232C } # GP-80010A
- TTL-serial } # GP-80010A
- 20 mA current loop } # GP-80010A
- IEEE-488 — # GP-80016A
- PC-8001 cable — #GP-80024B

When installing #GP-80010A or #GP-80016A interface board into GP-100, please use the longer spacers and screws packed with the interface board.

[7] CAUTION

- Wait at least two seconds to turn on the power after it is turned off, otherwise the Printer will not be initialized properly.
- Never place the Printer where it is exposed to direct sunlight.
- Never apply power while you are plugging in or unplugging an input connector.
- Never turn off the power while the Printer is in motion.
- Never try to move the print head manually, regardless if power is on or off.
- Do not stop the print head motion while it is printing.
- Do not print without paper and/or ribbon because the print head might be damaged.
- Turn off the power quickly and remove a foreign object, if you drop it into the Printer.
- Be sure to use the lock-levers after inserting an input connector into the Printer.
- Do not subject the Printer to temperatures below 5°C or above 40°C during operations, or to sudden change in temperature.
- Regarding printing duty.
  In graphic mode, using patterns of too high dot density will wear out the print head faster. We recommend that you use patterns whose dot density is equal to that of ordinary alphanumerics. The continuous printing of high dot density patterns may badly affect the longevity of the print head.
- Unplug the power cord before trying to take off the upper case.
- Be sure to minimize the 'drag' of the paper. When using multipart forms, you may need to position the paper supply close to the level of the printer, not on the floor.

[8] MAINTENANCE

We hope you don't have problems but just in case ... see if you can solve them by using the table below. If you can't, then try to determine which component in your system is at fault, and bring it into a store for repair.

Problems	Probable Causes/Solutions
Printer won't print. Power Indicator 'OFF'.	1) Printer power is 'OFF'. Check the connection and the power switch. 2) Fuse may be blown. Replace only with a fuse of the same rating.
Printer won't print. Power Indicator 'ON'.	1) Improper connection. Check the wiring of input data to the Printer. 2) Improper ribbon setting. Reset the ribbon.
Printer okay, but the paper won't advance.	Paper is jammed. Remove and reload the paper.
Printed characters are too light or smudging.	1) Improper printing pressure. Adjust the lever's position on the print head. 2) Wrong ribbon setting. Reset the ribbon. 3) Old or worn-out ribbon. Replace the ribbon.

[9] SPECIFICATIONS

1. General Specifications

A. Print method	Impact dot matrix print (Uni-hammer method)
B. Character matrix	5 x 7 dot matrix
C. Characters	116 upper/lower case characters, numerals and symbols
D. Graphics	Dot addressable. 7 vertical dots per column, max 480 columns.
E. Character codes	8-bit ASCII
F. Character size	Height: 7 dots (2.82 mm) Width: 5 dots (2.11 mm)
G. Print speed	50 characters/sec (left to right, uni-directional)
H. Max. number of columns	80 columns
I. Character spacing	10 characters/inch
J. Linefeed spacing	6 lines/inch ··· Character mode 9 lines/inch ··· Graphic mode
K. Linefeed speed	5 linefeeds/sec ··· Character mode 7.5 linefeeds/sec ··· Graphic mode
L. Paper feed	Pin feed
M. Paper width	4.5 to 10 inches acceptable
N. Multiple copies	2 including original
O. Inked ribbon	Single color, inked roller built-in cassette type
P. External dimensions	234.5D x 420W x 136H mm
Q. Weight	Approximately 4.5 kg

2. Operating Environment

A. Power requirements	220/240VAC ± 10% 50/60 Hz
B. Power consumption	20 watts (character printing) 8 watts (idling)
C. Temperature	5°C ~ 40°C
D. Humidity	20% ~ 80% (no condensation)

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